

Name: _____

Date: _____

Exam: Function Reflections (Solution version 5)

1. Let function f be defined by the polynomial below:

$$f(x) = 4x^5 - 2x^4 - 9x^3 - 8x^2 - 6x + 5$$

Draw lines that match each function reflection with its polynomial:

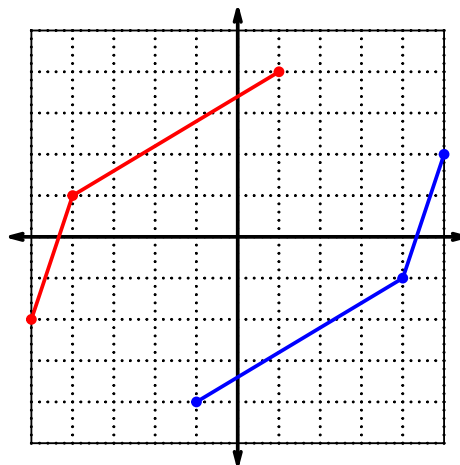
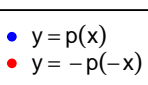
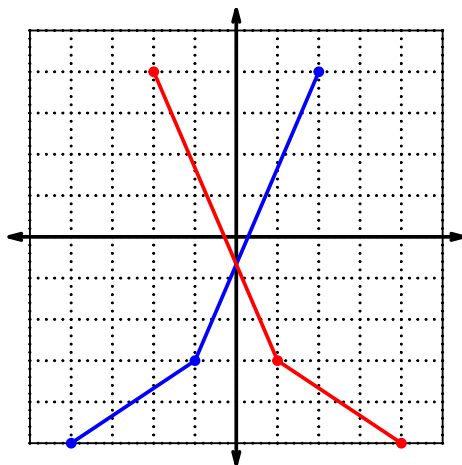
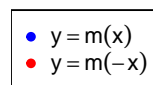
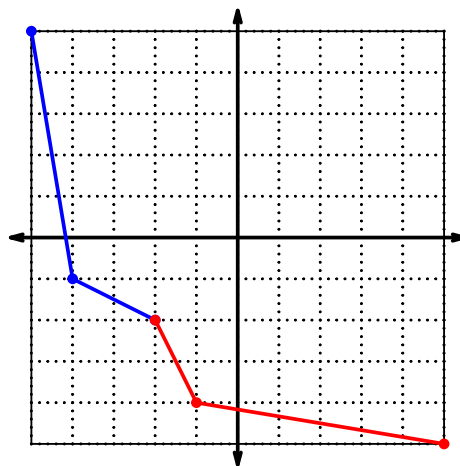
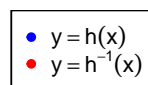
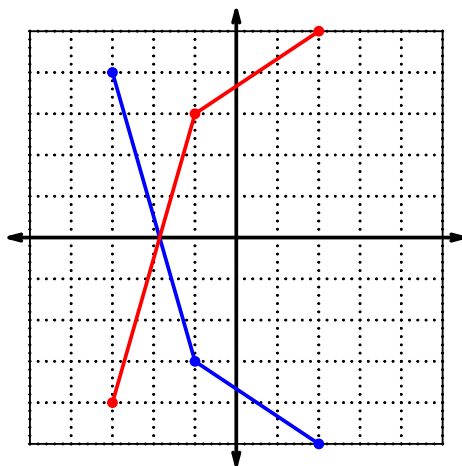
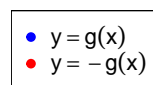
Reflections**Polynomials**

$$-f(x) \quad \bullet \text{---} \bullet \quad -4x^5 + 2x^4 + 9x^3 + 8x^2 + 6x - 5$$

$$f(-x) \quad \bullet \text{---} \bullet \quad -4x^5 - 2x^4 + 9x^3 - 8x^2 + 6x + 5$$

$$-f(-x) \quad \bullet \text{---} \bullet \quad 4x^5 + 2x^4 - 9x^3 + 8x^2 - 6x - 5$$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	1	9	8
2	5	6	4
3	9	2	9
4	3	7	1
5	4	1	2
6	8	4	3
7	6	8	7
8	2	3	5
9	7	5	6

3. Evaluate $f(9)$.

$$f(9) = 7$$

4. Evaluate $h^{-1}(1)$.

$$h^{-1}(1) = 4$$

5. Assuming h is an **even** function, evaluate $h(-3)$.

If function h is even, then

$$h(-3) = 9$$

6. Assuming g is an **odd** function, evaluate $g(-8)$.

If function g is odd, then

$$g(-8) = -3$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = -x^2 - 1$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 - 1$$

$$p(-x) = -x^2 - 1$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^2 - 1)$$

$$-p(-x) = x^2 + 1$$

- c. Is polynomial p even, odd, or neither?

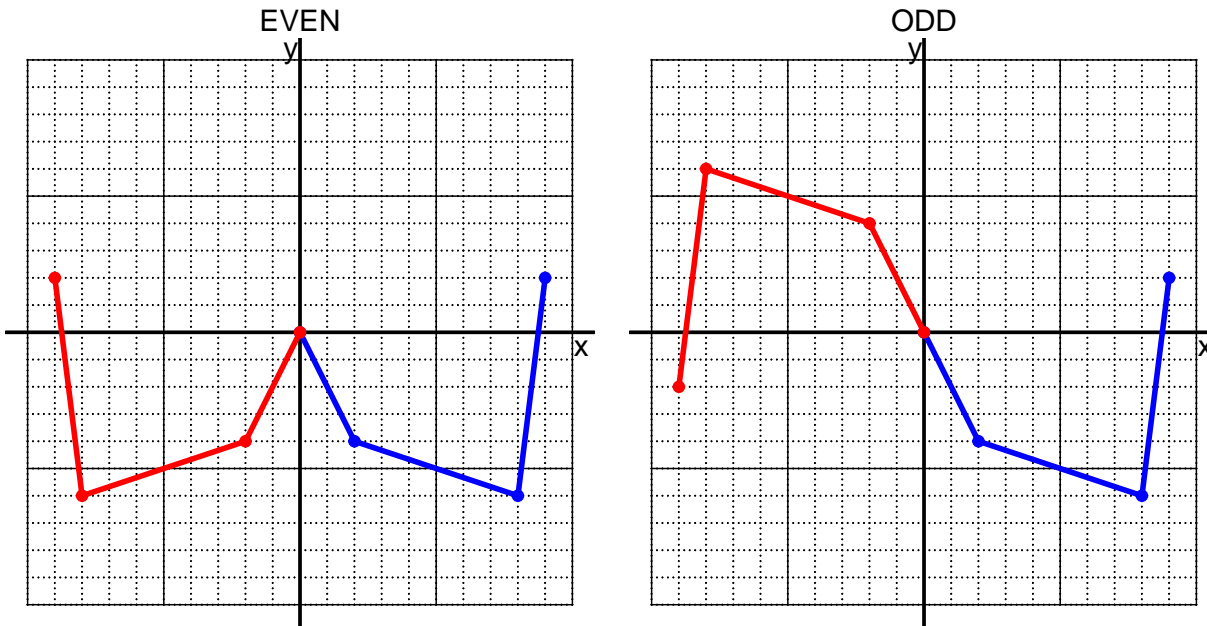
even

- d. Explain how you know the answer to part c.

We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 3x + 8$$

a. Evaluate $f(11)$.

step 1: multiply by 3
step 2: add 8

$$f(11) = 3(11) + 8$$

$$f(11) = 41$$

b. Evaluate $f^{-1}(83)$.

step 1: subtract 8
step 2: divide by 3

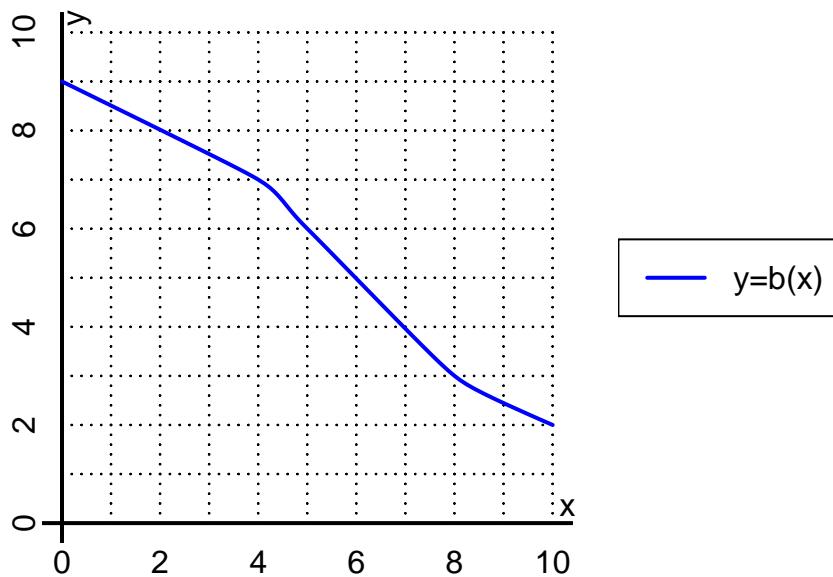
$$f^{-1}(x) = \frac{x - 8}{3}$$

$$f^{-1}(83) = \frac{(83) - 8}{3}$$

$$f^{-1}(83) = 25$$

Exam: Function Reflections (Solution version 5)

10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(5)$.

$$b(5) = 6$$

b. Evaluate $b^{-1}(7)$.

$$b^{-1}(7) = 4$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	3	-3	3	-3
-1	5	-5	-5	5
0	0	0	0	0
1	-5	5	5	-5
2	3	-3	3	-3

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.